

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:	BRÖCKER ET AL	DOCKET No.:	50487
SERIAL No.:	09/629,482	CONFIRMATION No.:	4024
FILING DATE:	07/31/2000	EXAMINER:	DANG, THUAN D.
CUSTOMER No.:	26474	ART UNIT:	1764
FOR: ISOTHERMAL OPERATION OF HETEROGENEOUSLY CATALYZED THREE PHASE REACTIONS			

Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Appeal brief under 37 C.F.R. § 41.37

Sir:

This is an appeal from the Examiner's final rejection of Claims 11 - 16, dated July 10, 2006. Claims 1 - 16 are currently pending.

The fee set forth in 37 C.F.R. § 41.20(b)(2) is paid by credit card. Form PTO-2038 is enclosed. Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account 14.1437. Please credit any excess fees to such account.

Respectfully submitted,  
Novak Druce & Quigg, LLP



Michael P. Byrne  
Registration No.: 54,015

1300 Eye St. N.W.  
Suite 1000 West  
Washington, D.C. 20005  
Phone: (202) 659-0100  
Fax: (202) 659-0105

REAL PARTY IN INTEREST:

The real party in interest is BASF Aktiengesellschaft, of Ludwigshafen, Germany.

RELATED APPEALS AND INTERFERENCES:

To the best of the undersigned's knowledge, there are no related interferences or judicial proceedings within the meaning of 37 C.F.R. §1.192(c).

STATUS OF CLAIMS:

- Claims 1 - 16 are pending in the application
- Claims 11 - 16 stand rejected, and are being appealed.
- Claims 1 - 10 stand withdrawn from consideration.

STATUS OF AMENDMENT:

No amendment was filed subsequent to the final rejection dated July 10, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention relates to a process for the isothermal operation of heterogeneously catalyzed reactions involving at least three phases in the form of a gaseous phase, a liquid phase and a solid phase.<sup>1</sup>

The independent claim involved in the appeal is claim 11. All other claims are dependent on claim 11. Summary of the subject matter of the dependent claims is omitted as unnecessary.

---

<sup>1</sup> Page 1, lines 9 – 12 of the Specification.

Claim 11 is directed to a process for carrying out a catalyzed three-phase reaction under isothermal conditions.<sup>2</sup> The three phases involved in this reaction are a gas phase, containing at least one gaseous reactant, a liquid phase containing at least one liquid reactant and a solid phase which is a catalyst.<sup>3</sup> The process of claim 11 comprises four steps. In the first step, a reaction fluid is generated by dispersing the gas phase in the liquid phase.<sup>4</sup> Subsequently, the generated reaction fluid is passed through a reactor.<sup>5</sup> The reactor space is equipped with woven or knitted metal fabrics coated with catalyst.<sup>6</sup> Care is taken to ensure that no substantial change in the degree of the dispersion of the reaction fluid occurs as it passes through the reactor.<sup>7</sup> Heat is transferred through the reactor to a cooling fluid medium on the reaction wall surface facing away the reactor space.<sup>8</sup> Finally the reaction fluid is separated into gas phase and liquid-phase.<sup>9</sup>

#### GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- Whether the examiner erred in rejecting Claims 11-16 under 35 U.S.C. §112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, and
- Whether the examiner erred in rejecting Claims 11 – 16 under 35 U.S.C. §103(a) as allegedly being obvious over Arganbright et al. (USPN 4,950,834).

#### ARGUMENT

##### **Rejections under 35 U.S.C. §112, second paragraph:**

Claims 11-16 stand rejected as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The examiner states that the phrase, “passing the generated reaction fluid, without substantial change in the degree of the dispersion of said reaction fluid, through a

<sup>2</sup> Page 1, lines 9 – 12 of the Specification.

<sup>3</sup> Page 1, lines 14 – 17 of the Specification.

<sup>4</sup> Page 3, lines 27 – 28 of the Specification.

<sup>5</sup> Page 7, lines 9 – 10 of the Specification.

<sup>6</sup> Page 3, lines 34 – 35 and Page 4, line 28 – Page 5, line 34 of the Specification.

<sup>7</sup> Page 4, lines 8 – 26 of the Specification.

<sup>8</sup> Page 6, lines 16 – Page 7, line 2 of the Specification.

<sup>9</sup> Page 7, lines 14 – 17 of the Specification.

reactor<sup>10</sup> is indefinite on the basis that:

it is unclear the change [sic] in the degree of dispersion is applied thru [sic] the entire the [sic] catalyst bed or just in the connection path between the ‘generating zone’ the [sic] reactor.<sup>11</sup>

In other words, the examiner argues that the phrase “passing the … fluid, without substantial change in the degree of dispersion … through a reactor”<sup>12</sup> would be misinterpreted by one possessing ordinary skill in the pertinent art. More specifically, the examiner argues that a skilled artisan would not be reasonably apprised that appellants have claimed a process in which the degree of dispersion is not substantially changed throughout the entire reactor. The examiner argues that a skilled artisan would interpret the phrase “passing the … fluid, without substantial change in the degree of dispersion … through a reactor”<sup>13</sup> as signifying that the degree of dispersion of the fluid could change when it passes through the reactor and that appellants have actually claimed a process in which the degree of dispersion only remains substantially unchanged through “the connection path between the generating zone [and] the reactor.”<sup>14</sup>

This rejection is in error. “The requirement to ‘distinctly’ claim means that the claim must have a meaning discernible to one of ordinary skill in the art when construed according to correct principles.... Only when a claim remains insolubly ambiguous without a discernible meaning after all reasonable attempts at construction must a court declare it indefinite.”<sup>15</sup> Moreover, “[i]n rejecting a claim under the second paragraph of 35 U.S.C. 112, it is incumbent on the examiner to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with reasonable degree of precision and particularity the particular area set out and circumscribed by the claims.”<sup>16</sup>

It is respectfully submitted that the phrase “passing the generated reaction fluid, without substantial change in the degree of the dispersion of said reaction fluid, through a

---

<sup>10</sup> Claim 11.

<sup>11</sup> Page 2, lines 10 – 12 of the final Office action of July 10, 2006 (emphasis in original).

<sup>12</sup> Claim 11.

<sup>13</sup> Claim 11.

<sup>14</sup> Page 2, lines 10 – 12 of the final Office action of July 10, 2006 (emphasis in original).

<sup>15</sup> *Metabolic Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1366, 71 USPQ2d 1081, 1089 (Fed. Cir. 2004).

<sup>16</sup> *Ex parte Wu*, 10 USPQ2d 2031 at 2033 (BPAI 1989).

reactor<sup>17</sup> has a clear and precise meaning that is readily discernible to one of ordinary skill in the art, especially when read in light of the present specification, which states:

The inventors have determined that improved mass transfer can only be obtained if the reaction fluid is a dispersion formed from the gas phase (as disperse phase) and the liquid (as dispersion medium) and the process and apparatus are designed in such a way that the dispersion, as it passes through the reactor, remains stable, i.e. substantially no increase in bubble size occurs.<sup>18</sup>

In this regard, the specification also points to particular features of the reactor, stating:

The reactor of the invention is designed for maintaining a high but uniform shearing stress on the reaction fluid. On the other hand, it will withstand a high cross-sectional flow velocity without attrition of the catalyst. On the other, the reaction fluid is exposed to a uniformly high shearing stress in the metal fabric. This provides for uniform mixing of the reaction fluid and hence for a constant degree of dispersion of the reaction fluid as it passes through the reactor.<sup>19</sup>

Accordingly, Appellants assert that instant claims 11 – 16, are definite and respectfully request reversal of the instant rejection under 35 U.S.C. §112.

#### Rejections under 35 U.S.C. §103:

Claims 11 – 16 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over Arganbright et al. (USPN 4,950,834). Appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. §103. When applying 35 U.S.C. § 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined.<sup>20</sup>

---

<sup>17</sup> Claim 11.

<sup>18</sup> Page 4, lines 8 – 15 of the Specification.

<sup>19</sup> Page 4, lines 17 – 26 of the Specification.

<sup>20</sup> *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."<sup>21</sup> Indeed, "to support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references."<sup>22</sup> The examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection.<sup>23</sup> "Second, there must be a reasonable expectation of success."<sup>24</sup> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.<sup>25</sup> That it would have been obvious to try is not sufficient.<sup>26</sup> "Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."<sup>27</sup>

In view of the above principles, the Examiner has not set forth a *prima facie* case of obviousness with regard to the invention of claim 11 as a whole, because claim 11 requires at least the following:

- I. Generating a Reaction Fluid
- II. Passing the Generated Reaction Fluid through a Reactor (without substantial change in the degree of dispersion of the reaction fluid)
- III. Reactor Space Equipped with Woven or Knitted Metal Fabrics Coated with Catalyst
- IV. Transferring Heat
- V. Separating the Reaction Fluid into Gas and Liquid phases

<sup>21</sup> MPEP §2143.

<sup>22</sup> *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

<sup>23</sup> See *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967), cert. denied, Appeal No. 2002-1187 389 U.S. 1057 (1968).

<sup>24</sup> MPEP §2143. See also: *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1354 (Fed. Cir. 2003).

<sup>25</sup> *In re Vaeeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

<sup>26</sup> *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1380 (Fed. Cir. 1986).

<sup>27</sup> MPEP §2143.

These requirements will be addressed one at a time, because a *prima facie* case of obviousness cannot be established if the cited reference fails to teach or suggest any one of the claim limitations, however, it is important to bear in mind that the claimed invention must be considered as a whole. Indeed, this invention is greater than the sum of its parts.

### I. Generating a Reaction Fluid

Claim 11 requires the step of “generating a reaction fluid by dispersing the gas phase containing the at least one gaseous reactant in the liquid phase, containing the at least one liquid reactant and producing a reaction thereby.” As described in the specification, dispersing of the gas phase in the liquid phase can be performed by a dispersing element, such as a liquid jet gas compressor, e.g., jet pumps for conveying and compressing gasses. In complete contrast, Arganbright et al. describe a dual bed system wherein a feed through the reactor is accomplished by separate feed streams.<sup>28</sup> Moreover, Arganbright et al. actively seek to avoid what they consider to be “the detriment of having all of the components of the reaction system continually in contact with the catalyst,”<sup>29</sup> emphasizing that “because [their] reaction is occurring concurrently with distillation, the initial reaction product is removed from the reaction zone as quickly as it is formed.”<sup>30</sup> Thus, it is clear that the reference not only fails to teach or suggest all of the claim limitations, but strenuously teaches away from generating a reaction fluid which could continually contact the catalyst. The examiner has failed to point to any teaching, suggestion or motivation for a person of ordinary skill in the art to modify the reference to arrive at a process which includes the step of generating a reaction fluid. Despite these clear differences, the Examiner asserts that:

“Arganbright discloses that the benzene and others flow to the bottom of the Omega sieve section to the Y sieve section.”<sup>31</sup>

<sup>28</sup> Col. 3, lines 1–5 of Arganbright et al. (US 4,950,834).

<sup>29</sup> Col. 3, lines 61 – 63 of Arganbright et al. (US 4,950,834).

<sup>30</sup> Col. 3, lines 23 – 25 of Arganbright et al. (US 4,950,834).

<sup>31</sup> Page 3 at lines 22 – 23 of the final Office action of July 10, 2006.

The examiner then speculates that:

“gas propylene stream 1 must be dispersed into this flowing down benzene stream before the mixture of benzene and propylene reacted further in the Y sieve.”<sup>32</sup>

However, the Examiner has considered the cited passage in a vacuum and has failed to consider the teachings of the reference as a whole. Indeed, the complete passage recited by Arganbright et al. do not describe an active process for generating a reaction fluid.

Arganbright et al specifically state, “[s]ince complete separation of the reaction products and benzene does not occur in Omega bed 12, cumene, small amounts of propylene, dimerized propylene...and benzene flow down the column into the Y-bed where any propylene and dimerized propylene may react with the benzene to produce additional cumene.”<sup>33</sup> This passage does not describe a step for generating a reaction fluid.

Products of a reaction and left-over reactants are merely allowed to flow to the bottom of the column. No intentional step of generating a reaction fluid by dispersing a gas phase in a liquid phase is described. Moreover, contrary to the examiner’s speculation, Arganbright et al. do not teach that the small amounts of propylene “must be dispersed” into any down-flowing benzene stream. In fact, Arganbright et al., teach away from this possibility by stating that additional reaction, if any, occurs in the Y-bed, i.e. by stating that “[products of a reaction and left-over reactants] ... flow down the column into the Y-bed where any propylene and dimerized propylene may react with the benzene to produce additional cumene.”<sup>34</sup> This passage clearly does not provide a teaching suggestion or motivation for a skilled artisan to intentionally generate a reaction fluid by dispersing a gas phase into a liquid phase.

In sum, the reference fails to teach or suggest all of the claim limitations, but instead teaches away from generating a reaction fluid. Where the prior art “teaches away” from the claimed invention rather than motivating a person of ordinary skill in the art to do what the patentee has done, the claimed invention is nonobvious.<sup>35</sup> The

<sup>32</sup> Page 4 at lines 1 – 2 of the final Office action of July 10, 2006.

<sup>33</sup> Col. 7, lines 24-34 of Arganbright et al. (US 4,950,834).

<sup>34</sup> Col. 7, lines 24-34 of Arganbright et al. (US 4,950,834).

<sup>35</sup> *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986); *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d

examiner has failed to point to any teaching, suggestion or motivation for a person of ordinary skill in the art to modify the reference to arrive at a process which includes the step of generating a reaction fluid. A *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 11 is in error and should be reversed. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious."<sup>36</sup> Thus, claims 12 – 16 are also nonobvious.

## II. Passing the Generated Reaction Fluid through a Reactor without substantial change in the degree of dispersion of the reaction fluid

Claim 11 also requires the step of "passing the generated reaction fluid, without substantial change in the degree of the dispersion of said reaction fluid, through a reactor."<sup>37</sup> First, since Arganbright et al. teach away from generating a reaction fluid (as discussed above), it is unreasonable to suggest that Arganbright et al. teach or suggest the passing of a generated reaction fluid through a reactor. The examiner has ignored this impossibility, but has, at least, admitted that:

"Arganbright does not disclose that ... the mixture of benzene and propylene does not substantially change in the [sic] degree of dispersion thru [sic] the reactor (Y sieve section)"<sup>38</sup>

The examiner further speculates that:

"the dispersion would not be change [sic] in the Y sieve section of the Arganbright process since the catalyst bed of the Arganbright reactor is made by the same material as the claimed reactor."<sup>39</sup>

It is noted that for the above-mentioned reasons, the examiner's use of the phrase "mixture of benzene and propylene" and the term "dispersion" is entirely inappropriate. It has already been noted that the examiner may not resort to speculation, unfounded

---

<sup>36</sup> 1540, 1552-53 (Fed. Cir. 1983).

<sup>37</sup> MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

<sup>38</sup> Claim 11.

<sup>39</sup> Page 4 at lines 3 – 5 of the final Office action of July 10, 2006.

<sup>39</sup> Page 4 at lines 6 – 8 of the final Office action of July 10, 2006 (emphasis added).

assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. Aside from being purely speculative, the examiner's assertion is wholly unreasonable because the present application makes clear that it is not simply the material of construction, but the overall design of the reactor and catalyst which influence whether a substantial change in the degree of the dispersion of the reaction fluid occurs as it passes through the reactor. The present invention discloses a reactor designed for maintaining a high but uniform shearing stress on the reaction fluid. This design provides for uniform mixing of the reaction fluid and a constant degree of dispersion of the reaction fluid as it passes through the reactor.<sup>40</sup>

The Arganbright et al. reference provides no teaching, suggestion or motivation to create a reaction fluid; no teaching, suggestion or motivation to avoid substantial change in the degree of dispersion of a reaction fluid as it passes through a reactor; and, quite naturally, no teaching suggestion or motivation as to how to arrive at a process wherein the overall design of the reactor and catalyst influence whether a substantial change in the degree of the dispersion of a reaction fluid occurs as it passes through a reactor. The Arganbright et al. reference, therefore, fails to teach or suggest all of the claim limitations, and the examiner has failed to establish a *prima facie* case of obviousness. For at least these reasons, the rejection of claim 11 is in error and should be reversed. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious."<sup>41</sup> Thus, claims 12 – 16 are also nonobvious.

### III. Reactor Space Equipped with Woven or Knitted Metal Fabrics Coated with Catalyst

Claim 11 requires that the reaction fluid be passed "through a reactor whose reactor space is equipped with woven or knitted metal fabrics coated with catalyst."<sup>42</sup> The examiner's initial rejection did not point to a teaching, suggestion or motivation for a skilled artisan to have arrived at this feature of the present invention. In response to remarks presented by the appellants, however, the examiner has stated that:

---

<sup>40</sup> Page 4, indicated lines 17 – 26 of the Specification.

<sup>41</sup> MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

<sup>42</sup> Claim 11.

Arganbright discloses that the molecular sieve can be enclosed in the screen wire which is knitted. Clearly sieves must be on the knitted wire (coated).<sup>43</sup>

The examiner has failed to examine the Arganbright et al. reference as a whole, and has instead resorted to cherry-picking distinct aspects from the reference to construct the rejection. The Federal Circuit in *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143, n.5 (Fed. Cir. 1986) stated that "references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination." In this regard, the Examiner examined only parts of the cited art references picking and choosing only disclosures allegedly favorable for establishing *prima facie* obviousness.

Arganbright et al. discuss the use of mole sieve catalysts. The examiner cites column 5, lines 20 – 22, which state: "the particulate mole sieves may be employed by enclosing them in a porous container such as a cloth, screen wire or polymeric mesh." Even on the basis of this hand-selected portion of Arganbright et al., the examiner has failed to establish a *prima facie* case of obviousness; a reference disclosing the enclosure of catalytic particles in a container such as a cloth, screen wire or polymeric mesh in no way teaches or suggests the utilization of a woven or knitted metal fabric coated with a catalyst. The examiner's assertion that "[c]learly sieves must be on the knitted wire (coated),"<sup>44</sup> is precisely the opposite of what Arganbright et al. disclosed, i.e. that catalytic particles are enclosed in a container. Catalytic particles are not enclosed in containers in the present invention. The present invention effectively makes woven or knitted metal fabrics catalytically active, by coating them with catalyst. When properly considered as a whole, the Arganbright et al. reference teaches away from such a configuration. The examiner cherry-picked Column 5, lines 20 – 22, but the next two lines make clear that "[t]he material used to make the container must be inert to the reactants and conditions in the reaction system."<sup>45</sup> Thus, the Arganbright et al. reference fails to teach or suggest all of the claim limitations, because it fails to teach woven or knitted metal fabrics coated with catalyst. Moreover, Arganbright et al., teach away from making such a modification to their system. The examiner has failed to establish a *prima*

<sup>43</sup> Page 3, lines 1 – 3 of the Advisory Action dated October 27, 2006.

<sup>44</sup> Page 3, lines 1 – 3 of the Advisory Action dated October 27, 2006 (emphasis added).

<sup>45</sup> Column 5, lines 23 – 24 of Arganbright et al. (US 4,950,834).

*facie* case of obviousness. For at least these reasons, the rejection of claim 11 is in error and should be reversed. “If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.”<sup>46</sup> Thus, claims 12 – 16 are also nonobvious.

#### IV. Transferring Heat

Claim 11 requires the step of “transferring the heat through the reactor to a cooling fluid medium on the reaction wall surface facing away the reactor space.”<sup>47</sup> With regard to this required step, the examiner has admitted that:

“Arganbright does not disclose … using a cooling fluid medium for delivering heat away from the reactor.”<sup>48</sup>

Yet, the examiner speculates that:

“it is expected that the heat of the reaction will be transfer [sic] from the wall of the reactor via the surrounding air.”<sup>49</sup>

The examiner further speculates that:

“it would have been obvious to one having ordinary [sic] skill in the art at the time the invention was made to have modified the Arganbright process by employing air conditioners to cool down the room to arrive at the applicants’ claimed process to avoid the reaction room is too hot [sic].”<sup>50</sup>

Again, the examiner may not resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. Moreover, as will be pointed out, the examiner’s assertion is wholly contrary to the teachings of Arganbright et al., who specifically teach controlling temperature by modifying pressure.

---

<sup>46</sup> MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

<sup>47</sup> Claim 11.

<sup>48</sup> Page 4 at lines 3 – 5 of the final Office action of July 10, 2006.

<sup>49</sup> Page 4 at lines 9 – 10 of the final Office action of July 10, 2006.

<sup>50</sup> Page 4 at lines 11 – 14 of the final Office action of July 10, 2006 (emphasis added).

In the present invention, heat transfer is provided by a heat exchanger, for example, as described in the specification as comprising a plate type heat exchanger or a spiral type heat exchanger, which, as illustrated in FIG. 4, utilizes a counter-current flow, albeit co-current arrangements are also disclosed. On the other hand, Arganbright does not disclose cooling systems, e.g., countercurrent type heat exchangers, but rather, discloses, “[t]he temperature of the reactor is determined by boiling point of the liquid mixture... To change the temperature the pressure is changed. Temperature in the reaction zone is thus controlled by pressure; by increasing the pressure, the temperature in the system is increased, and vice versa.”

Accordingly, not only has the Examiner failed to consider the teachings of Arganbright as a whole (Arganbright teaches pressure not an air conditioned room), but the Examiner's proposed modification is wholly contrary to the teachings of Arganbright. Indeed, Arganbright specifically teaches controlling temperature by virtue of modifying pressure. Furthermore, there is simply no reasonable expectation that the combination/modification propounded by the Examiner would be successful; that is, the Examiner's contention that an air conditioned room would be sufficient to control reactor temperature, or be sufficient to cool the instant claimed reactor is tenuous at best, wholly speculative and completely unreasonable absent objective evidence illustrating the same.

Since the Arganbright et al. reference fails to teach or suggest all of the claim limitations the examiner has failed to establish a *prima facie* case of obviousness. Additionally, Arganbright et al. teach away from making the examiner's proposed modification of cooling via an air conditioned room by pointing towards controlling the temperature via pressure. Where the prior art "teaches away" from the claimed invention rather than motivating a person of ordinary skill in the art to do what the patentee has done, the claimed invention is nonobvious.<sup>51</sup> Finally, a skilled artisan would not have reasonably expected the modifications proposed by the examiner to be successful. Thus, the examiner has failed to establish a *prima facie* case of obviousness. For at least these reasons, the rejection of claim 11 is in error and should be reversed. "If an independent

---

<sup>51</sup> *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986); *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1552-53 (Fed. Cir. 1983).

claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.”<sup>52</sup> Thus, claims 12 – 16 are also nonobvious.

#### V. Separating the Reaction Fluid into Gas and Liquid phases

Claim 11 requires the step of “separating the reaction fluid into gas phase and liquid-phase.” First, since Arganbright et al. teach away from generating a reaction fluid (as discussed above), it is unreasonable to suggest that Arganbright et al. teach or suggest separating a reaction fluid into gas and liquid phases. Moreover, the Arganbright et al. reference is directed to catalytic distillation. Arganbright et al. specifically note that:

The success of catalytic distillation lies in an understanding of the principles associated with distillation. First, because the reaction is occurring concurrently with distillation, the initial reaction product is removed from the reaction zone as quickly as it is formed .... Third, the reaction has an increased driving force because the reaction products have been removed and cannot contribute to reverse reaction (Le Chatelier’s Principle).<sup>53</sup>

The examiner has failed to establish a *prima facie* case of obviousness, because the examiner has failed to point to a teaching, suggestion or motivation to modify the disclosure of Arganbright et al. to arrive at a process which includes a step for “separating the reaction fluid into gas phase and liquid-phase.”<sup>54</sup>

As already mentioned, the Arganbright et al. process teaches away from generating a reaction fluid in the first place. Moreover, in the Arganbright et al. process “the initial reaction product is removed from the reaction zone as quickly as it is formed,”<sup>55</sup> flowing to the bottom of the distillation column and exiting via line 8, and

[t]he feed of propylene is adjusted such that there is a molar excess of benzene in the reactor, such that the overhead **5** is primarily benzene, the propylene having been almost totally reacted. In addition to benzene and some propylene

<sup>52</sup> MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

<sup>53</sup> Column 3, lines 19 – 35 of Arganbright et al. (US 4,950,834).

<sup>54</sup> Claim 11.

<sup>55</sup> Column 3, lines 24 – 25 of Arganbright et al. (US 4,950,834).

other lights go off overhead. The overhead is passed to condenser 13 which is operated to condense substantially all of the benzene ....<sup>56</sup>

Thus, Arganbright et al. never disclose “separating [a] reaction fluid into gas phase and liquid-phase[,]”<sup>57</sup> and, the examiner has failed to establish a *prima facie* case of obviousness. For at least these reasons, the rejection of claim 11 is in error and should be reversed. “If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.”<sup>58</sup> Thus, claims 12 – 16 are also nonobvious.

<sup>56</sup> Column 7, lines 37 – 44 of Arganbright et al. (US 4,950,834) (emphasis in original).

<sup>57</sup> Claim 11.

<sup>58</sup> MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

CLAIMS APPENDIX.

1. (withdrawn) Apparatus for carrying out reactions involving a gaseous phase, a and a solid phase being a catalyst, which comprises the steps of, comprising
  - a dispersing element (6) for dispersing a gas phase in a liquid phase to generate a reaction fluid,
  - at least one reactor (1) which possesses an inlet (31, 41), an outlet (43) and a reactor space bounded by heat-removing walls which are spaced apart substantially uniformly along the main flow axis of the reaction fluid, and which is fitted with catalyst-coated metal fabric (20,32), and
  - a feed line (7) which routes the reaction fluid from the dispersing element (6) to the reactor inlet (31,41) and is sufficiently short that the degree of dispersion of the reaction fluid does not substantially change in the course of the passage through the feed line.
2. (withdrawn) Apparatus as claimed in claim 1, wherein the metal fabric (20,32) is knitted metal fabric.
3. (withdrawn) Apparatus as claimed in claim 1, wherein the metal fabric (20,32) is knitted metal fabric.
4. (withdrawn) Apparatus as claimed in claim 1, wherein the dispersing element (6) is a liquid jet gas compressor.
5. (withdrawn) Apparatus as claimed in claim 1, wherein the reactor (1) is constructed as a heat exchanger.
6. (withdrawn) Apparatus as claimed in claim 5, wherein the reactor (1) is constructed as a plate type heat exchanger.
7. (withdrawn) Apparatus as claimed in claim 5, wherein the reactor (1) is constructed as a spiral type heat exchanger.
8. (withdrawn) Apparatus as claimed in claim 5, wherein the walls in the reactor are spaced from 1 to 3 mm apart.
9. (withdrawn) Apparatus as claimed in claim 5, wherein the walls in the reactor are spaced from 2 to 20 mm apart.

10. (withdrawn) Apparatus as claimed in claim 5, wherein the walls in the reactor are spaced from 4 to 10 mm apart.
11. (previously presented) A process for carrying out a reaction under isothermal conditions involving a gas phase, containing at least one gaseous reactant, a liquid phase containing at least one liquid reactant and a solid phase which is a catalyst, which comprises the steps of
  - generating a reaction fluid by dispersing the gas phase containing the at least one gaseous reactant in the liquid phase, containing the at least one liquid reactant and producing a reaction thereby,
  - passing the generated reaction fluid, without substantial change in the degree of the dispersion of said reaction fluid, through a reactor whose reactor space is equipped with woven or knitted metal fabrics coated with catalyst
  - transferring the heat through the reactor to a cooling fluid medium on the reaction wall surface facing away the reactor space, and
  - separating the reaction fluid into gas phase and liquid-phase.
12. (original) A process as claimed in claim 11, operated with separate partial recycling of gas phase and/or liquid phase.
13. (original) A process as claimed in claim 11, wherein the superficial liquid velocity in the reactor is from 100 to 66 m<sup>3</sup>.m<sup>-2</sup>h).
14. (original) A process as claimed in claim 11, wherein the superficial gas velocity from 0.5 to 15 cm/s.
15. (original) A process as claimed in claim 11, wherein the reaction fluid in the reactor is under a pressure of from 0.1 to 200 bar.
16. (original) A process as claimed in claim 11, wherein the reaction fluid in the reactor has a temperature of from 25 to 250°C.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.